JWARS and the HLA

Analysis Forum

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JWARS Mission & Analytic Needs

Users

- CINCs
- Joint Staff
- JWCA
- Services
- OSD
- Other DoD

Uses

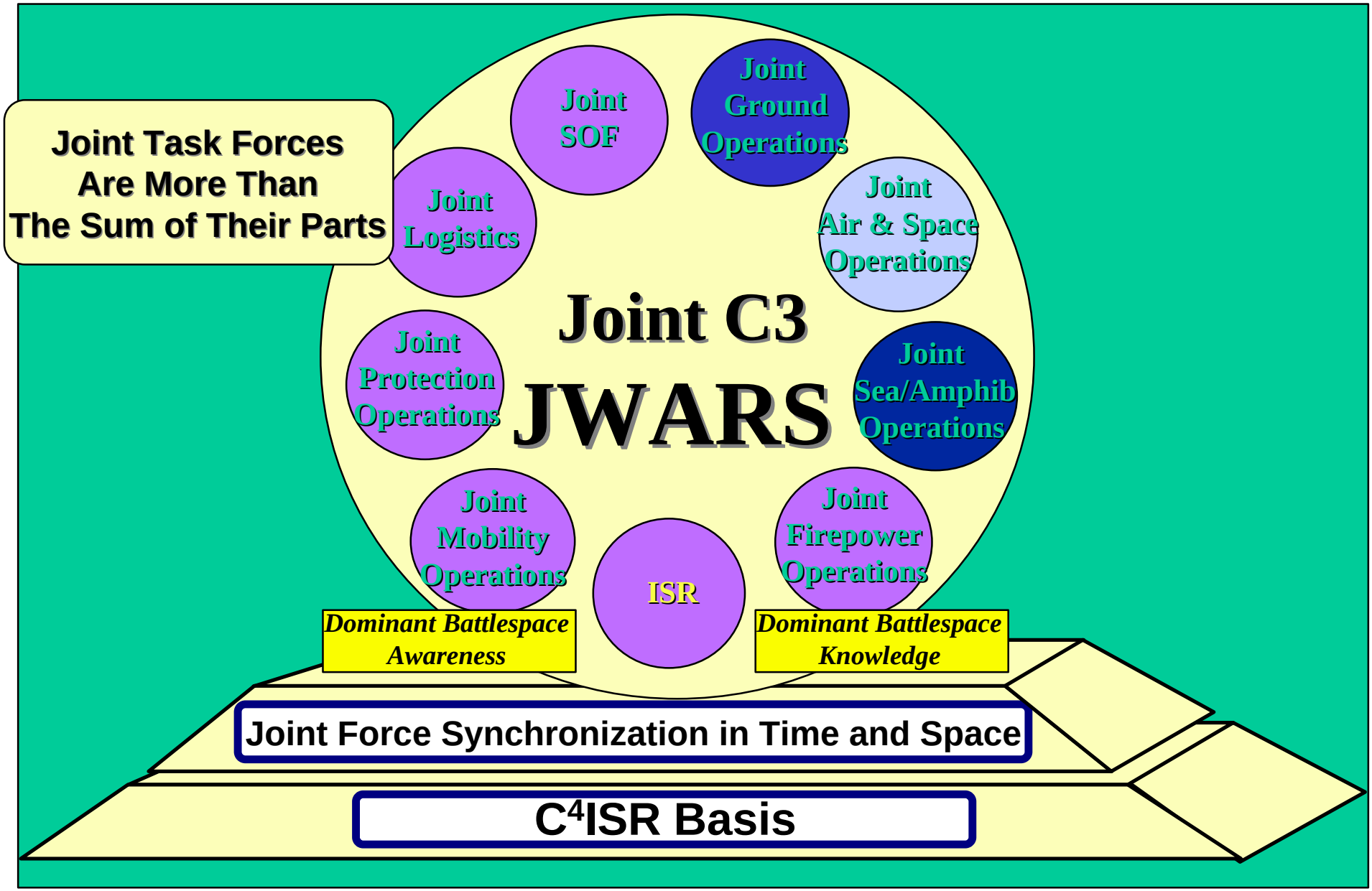
- Evaluation of courses of action (COAs)
- Analysis of force sufficiency
- Issue development
- Joint capability trade-off
- Analysis of system alternatives
- System trade-off
- Objective force planning and force structure design
- Examination of operational concepts
- Force and system trade-offs

JWARS Mission

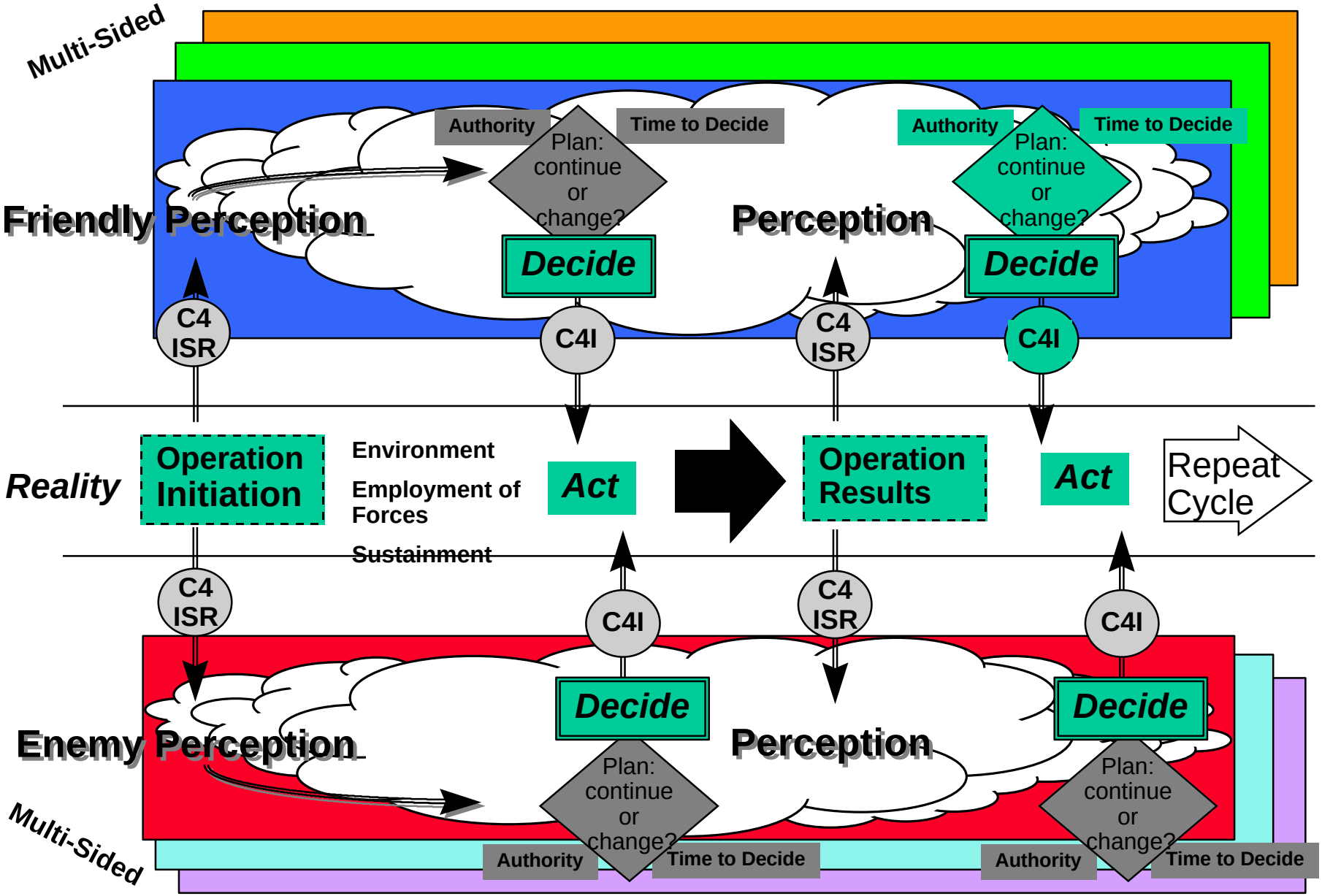
Develop a fully integrated, state-of-the-art, closed-form model of joint warfare. The model must:

- **Represent uniquely joint functions and processes and component warfare operations.**
- **Be based in joint doctrine and capable of representing future warfare.**
- **Aid in force structure analysis, acquisition analysis, and CINC course of action analysis.**

JWARS Scope


Joint Task Forces
Are More Than
The Sum of Their Parts
Joint SOF
Joint Ground Operations
Joint Logistics
Joint Air & Space Operations
Joint C3
JWARS
Joint Protection Operations
Joint Sea/Amphib Operations
Joint Mobility Operations
ISR
Joint Firepower Operations
Dominant Battlespace Awareness
Dominant Battlespace Knowledge
Joint Force Synchronization in Time and Space
C4ISR Basis

Overall Model Construct



Other JWARS Objectives

JWARS must:

- **Replace TACWAR and MIDAS**
- **Support both deterministic and stochastic analyses**
- **Support selectable levels of aggregation**
- **Provide transparency into its internal operations**

JWARS Prototype: Proof-of-Concept

Prototype Objectives:

- Develop a high-level design for production versions
- Examine issues that will drive the JWARS architecture
- Test drive the software development process
- Serve as a testbed for HLA experimentation

Results :

- *Design* (object classes & composable approach) developed; testing (scalability & runtime) underway
- *Architecture* developed; testing underway
- *Software development process* refined - IOC ready
- *C4ISR Issues* addressed:
  - - Battlespace perception (intelligence planning, collection, processing and SITMAP) link to battle management
  - - Sensor operations
  - - Battle management - key decisions based on SITMAP
  - - Data display for post processing analysis

High Level Architecture

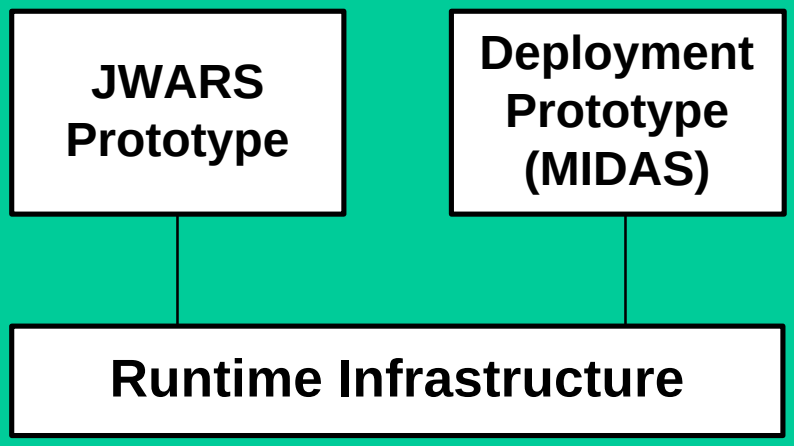
- **Major functional elements, interfaces, and design rules, pertaining to all DoD simulation applications, and providing a common framework within which specific system architectures can be defined**

DoD Policy:

" Under the authority of [DoD Directive 5000.59], and as prescribed by [the DoD Modeling and Simulation Master Plan], I designate the High Level Architecture as the standard technical architecture for all DoD simulations."

Dr. Paul Kaminski
10 September 1996

HLA Analysis Protofederation



- Faster than real time, closed form analysis simulation
- Key Issues:
  - Time management
  - Data filtering
  - Replicability
  - Runtime efficiency

Results: Although improvements are still possible, HLA provides the infrastructure necessary to achieve JWARS distributed simulation needs

JWARS/HLA Collaboration

So ..., how will JWARS take advantage of the framework and supporting software offered by the HLA???

JWARS Distributed Modes

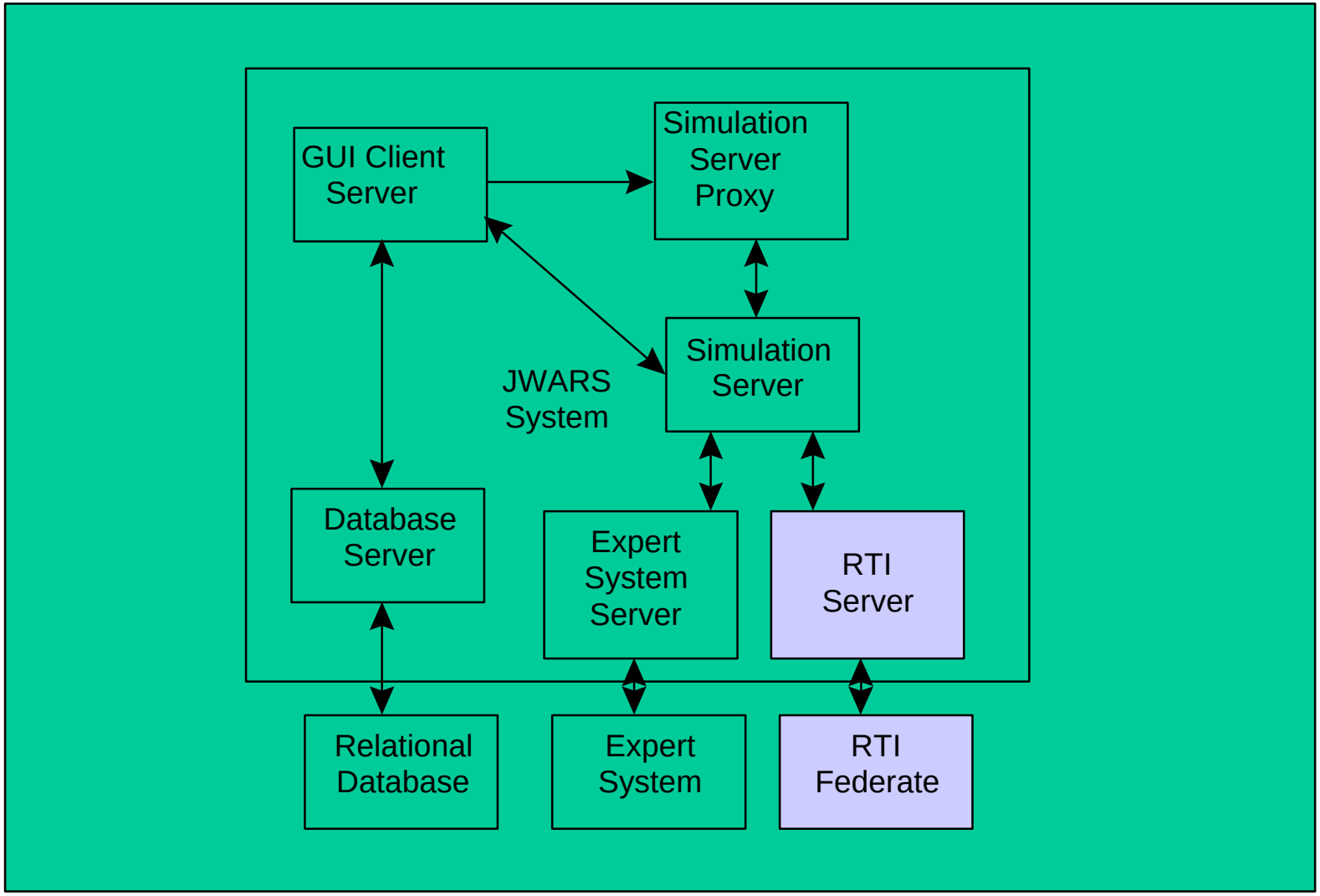
Inter-Federate:

- Exchange data (publish/subscribe) with other external simulation systems within a shared problem space.

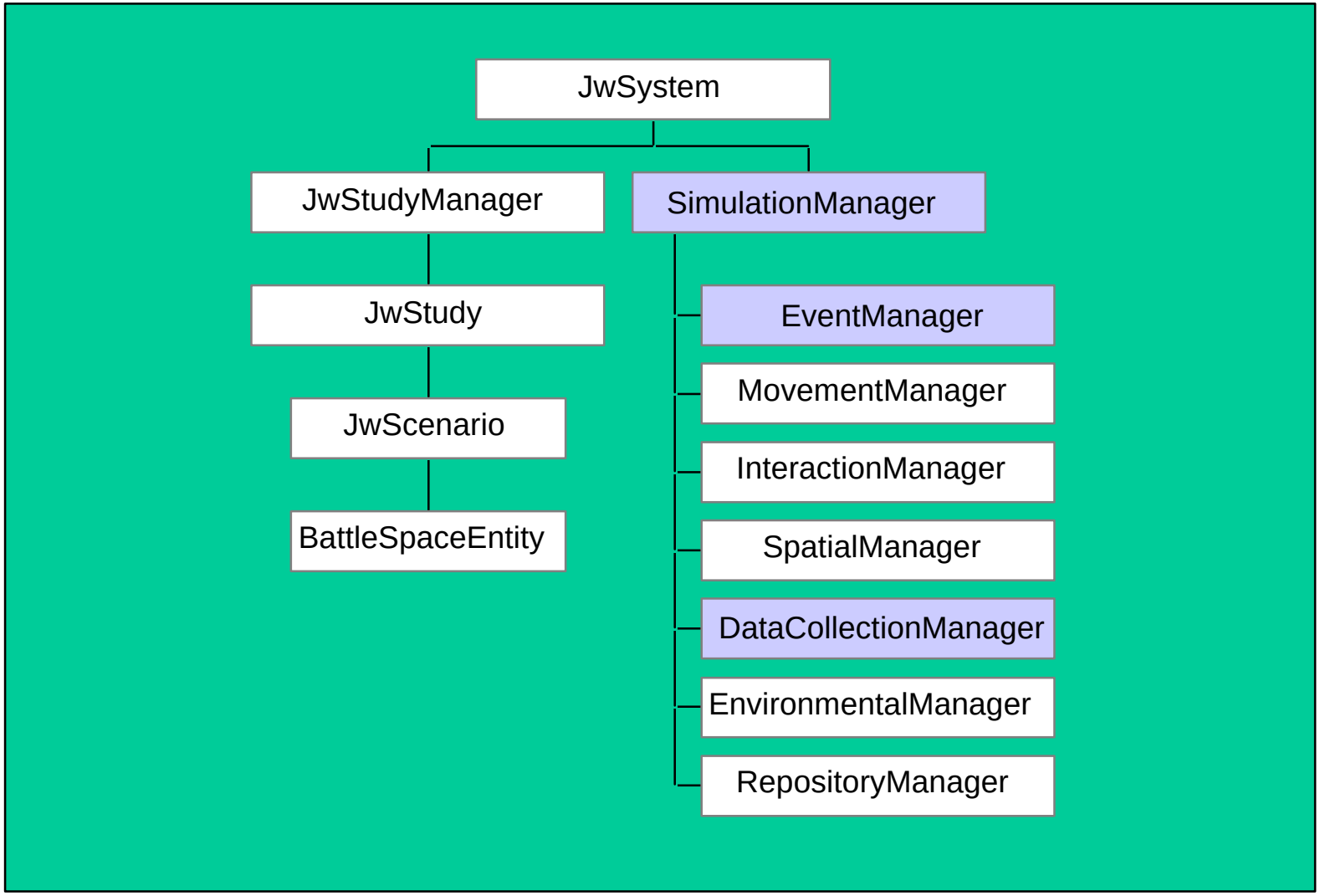
Intra-Federate:

- Distribute processing load among multiple JWARS executions across multiple platforms.
  - > Utility depends on amount of communication required across executions

JWARS Internal Architecture



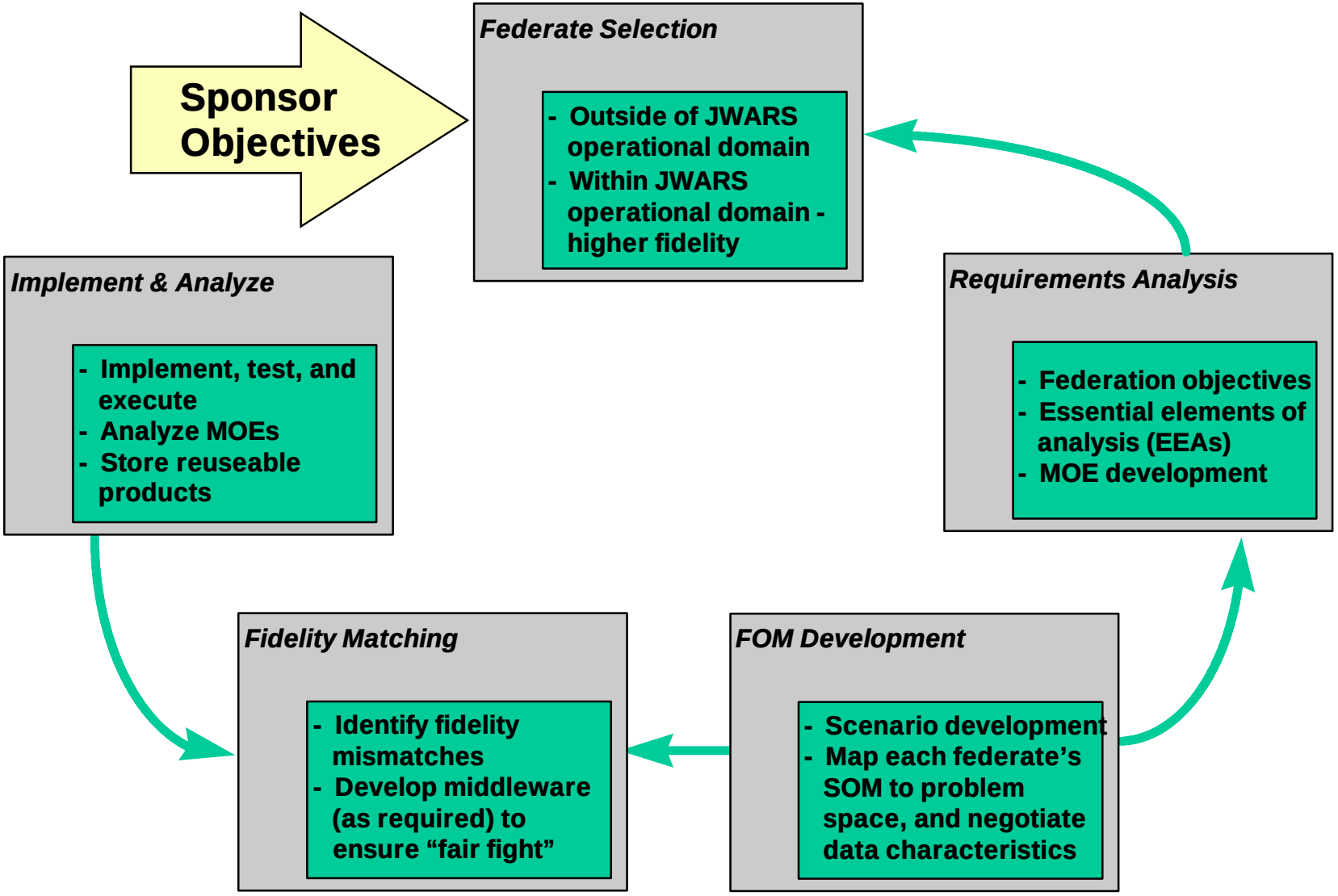
JWARS Simulation Architecture



JWARS SOM Development

- Will follow HLA SOM Development Process Model where appropriate
- Will be based on “public” elements of JWARS Data Element Dictionary
- Will utilize HLA Object Model Data Dictionary wherever possible
  - Non-matching data elements will be offered for possible OMDD inclusion
- Will use the HLA Object Model Development Tool (OMDT)
- Will submit completed SOM to HLA Object Model Library (OML)

JWARS Federation Development Process



Summary

- JWARS must be designed to be interoperable with other simulation systems
- HLA will provide the means for all external communication with other simulations
- HLA also provides a means (in particular circumstances) for distributing processing internally
- The JWARS architecture is being designed to take full advantage of the functionality HLA provides